

REMARKS

Applicant respectfully requests reconsideration and allowance of claims 1-2, 4-14, 16, 17, and 19-41, which are pending and stand rejected in the above-identified application. Applicant has amended claims 1, 16, 38 and 40 while canceling claim 15 herein. No new matter is added by the amendments. Support for the amendments may be found in at least FIGS. 8, 12 and paragraphs [0113] and [0117] of the specification as filed. In view of the following discussion, Applicant submits that all pending claims are in condition for allowance.

I. Objection to the drawings

At page 2 of the subject Office Action, the Examiner objects to the drawings on the basis that they fail to show certain features recited in the claims. In response to this objection, applicant submits new sheets comprising figures 15a, 15b and 16 that show the use of the claimed image recognition system within different equipment such as PDAs, laptops, vehicles etc. as recited in claims 35 and 39. Regarding claims 37, 38 and 40, the incorporation of the image optics as recited in the claims within cameras is clearly disclosed at Figs. 5, 6, 7 etc. Regarding claim 36, it is submitted that this claim recites method step regarding the use of the image recognition system in security technology while claim 41 recites use of the claimed image recognition system for object recognition such as cameras. Therefore, this rejection should be withdrawn at least in view of the new drawing sheets submitted herewith and in view of the aforementioned remarks.

II. Rejection of Claims 1, 2, 4, 9, 17 and 26 under 35 U.S.C. §103(a):

At numbered part 1 of the Office Action, the Examiner has rejected claims 1, 2, 4, 9, 17, and 26 under 35 U.S.C. §103(a) as being unpatentable over Kato (U.S. Pat. No. 5,682,203) in view of Takahashi et al. (U.S. 20010026322) and in further view of Mates (U.S. 20030111593). In view of the amendments herein, Applicant respectfully submits that the Examiner's claim rejection has been overcome.

Amended independent claim 1 recites, in part, “the regularly disposed optical channels having the at least one microlens are arranged as a monolithic plate on the at least one detector and the optical channels are optically isolated from each other”.

Kato in view of Takahashi et al. and in further view of Mates do not teach or suggest such claim aspects.

Kato relates to a solid-state image sensing device including a plurality of photo cells provided on a substrate and a plurality of micro condenser members each provided on a corresponding photo cell. Accordingly, Kato discloses that the interval at which the micro condenser members are arranged at a central portion of the substrate differs from the interval at which the micro condenser members are arranged at a peripheral portion. (*See*, Kato Abstract). However, the micro lenses 3 as disclosed by Kato are arranged near the central area 1a of the surface of the substrate 1 such that they maintain a constant interval MC therebetween in both the longitudinal direction 1c and the lateral direction 1d. The micro lenses 3 that are arranged on the peripheral area 1b are at an interval MH in the longitudinal direction 1c and at an interval MV in the lateral direction 1d. (*See*, Kato col. 4 lines 66 – col. 5 line 5). Hence, Kato does not disclose or suggest arranging the optical channels as a monolithic plate as recited in claim 1.

Takahashi et al. fails to make up for the aforementioned deficiency of Kato with respect to the claimed subject matter. In particular, Takahashi et al. relates to an image pickup apparatus which includes an image pickup area including a plurality of photoelectric conversion areas, a plurality of converging lenses for converging light on a plurality of photoelectric conversion areas, and a light shielding area having a plurality of opening areas through which light is incident upon the plurality of photoelectric conversion areas, wherein positions of the converging lens and opening area are shifted inward than a corresponding photoelectric conversion area. (*See*, Takahashi et al. Abstract). In particular, Takahashi et al. shows at Figs. 4a and 4b a light shielding layer having a light shielding area for shielding the area of the pixel 1 excepting the photodiode 5. An opening area 3 is formed through the light shielding layer 2 through which light is incident upon the photodiode 5. A microlens 4 is used for converging light on the photodiode 5. Thus, as seen from Figs. 4a, 4b, the

microlens and the photodiodes 5 are placed such that they maintain a finite distance from each other. Hence, it can be concluded that Takahashi et al. also fails to disclose or suggest arranging the optical channels as a monolithic plate as recited in claim 1.

Mates discloses an integrated circuit-based compound eye includes a plurality of photodetector elements disposed on a semiconductor substrate. The apparatus in accordance with Mates, comprises a plurality of photodetector elements 105 (pixels, light receptor, photoreceptor and/or optoelectronic elements) disposed on a substrate 110, such as a semiconductor substrate and light directing member 115 including a plurality of light directing elements 120 such as an array of lenslets, a plurality of light pipes bundled together or micromachined elements that are movable etc.

(See, Mates Fig. 1 and paragraphs [0021-0023]). However, as seen from Fig. 1 of Mates, the light directing elements 120 and the photodetector elements 105 are arranged at a finite distance from each other. Hence, it can be concluded that Mates also fails to disclose or suggest arranging the optical channels as a monolithic plate as recited in claim 1.

In contrast, an embodiment of the claimed subject matter relates to a device wherein optical channels having at least a microlens and at least one detector are formed as a monolithic plate 20 as shown at applicant's Fig. 8. This facilitates reducing a length of the system comprising such a microlens array. (See, FIG. 8; and paragraphs [0113] of the specification as filed.)

In view of at least the foregoing, it is submitted that a combination of the cited art does not teach or suggest all aspects of independent claim 1. Hence, this rejection should be withdrawn with respect to this claim and all claims depending therefrom.

III. Rejection of Claim 5 under 35 U.S.C. §103(a):

At numbered part 2 of the subject Office Action, claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view Takahashi et al., Mates and further in view of Beeson et al. (U.S. 5,521,725). Withdrawal of this rejection is requested for at least the following reasons. The

cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. Beeson relates to an optical illumination system comprising a waveguide that accepts light generated by a diffuse light source and transmits the light via total internal reflection. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 5 which depends therefrom.

IV. Rejection of Claims 6, 7, and 20-23 under 35 U.S.C. §103(a):

At numbered part 3 of the subject Office Action, claims 6, 7, and 20-23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view of Takahashi et al., Mates and further in view Applicant's Admitted Prior Art (AAPA). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claims depend.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. AAPA fails to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claims 6, 7 and 20-23 which depend therefrom.

V. Rejection of Claims 8, 11-13, 19 and 27-29 under 35 U.S.C. §103(a):

At numbered part 4 of the subject Office Action, claims 8, 11-13, 19 and 27-29 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kato, Takahashi et al., Mates and further in

view Miyatake et al. (U.S. 20060072029). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claims depend.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. Miyatake et al. relates to an image input apparatus which reconfigures a single reconfigured image from a plurality of low-resolution, object reduced images formed in a specified region on the light detecting element by the micro-lens array. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claims 8, 11-13, 19 and 27-30 which depend therefrom.

VI. Rejection of Claim 10 under 35 U.S.C. §103(a):

At numbered part 5 of the subject Office Action, claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view Takahashi et al. and Mates and further in view of Meyers (U.S. 6,141,048). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. Meyers relates to an image capture device incorporates an array of photodetectors, utilizing an integral current mirror formed at each photodetector location to increase photodetector current output. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 10 which depends therefrom.

VII. Rejection of Claim 14 under 35 U.S.C. §103(a):

At numbered part 6 of the subject Office Action, claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view of Takahashi et al. and Mates and further in view of Takayama (U.S. 20050041134). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. Takayama relates to a solid-state image pickup apparatus that includes a two dimensionally arranged light receiving pixel group having light receiving pixels to convert photoelectrically incident light and a microlens array to be two-dimensionally arranged to correspond in position to the light receiving pixels. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 14 which depends therefrom.

VIII. Rejection of Claim 16 under 35 U.S.C. §103(a):

At numbered part 7 of the subject Office Action, claim 16 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view of Takahashi et al. and Mates and further in view of Miyatake et al. and Takayama. Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. Furthermore, as discussed *supra*, Miyatake et al. and Takayama, fail to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates

with respect to independent claim 1. Therefore, this rejection should be withdrawn with respect to claim 16 which depends therefrom.

IX. Rejection of Claim 24 under 35 U.S.C. §103(a):

At numbered part 8 of the subject Office Action, claim 24 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato, Takahashi et al. and Mates and further in view of Nagaoka et al. (U.S. 20040218283). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al. and Mates as discussed above apply with equal weight here. Nagaoka et al. relates a variable optical element is formed by a first liquid member, a second liquid member which is insoluble in the first liquid member, a container which contains the first liquid member and the second liquid member, an index for positioning the variable optical element according to a predetermined reference. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al. and Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 24 which depends therefrom.

X. Rejection of Claim 25 under 35 U.S.C. §103(a):

At numbered part 9 of the subject Office Action, claim 25 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato, Takahashi et al. and Mates in view of Miyatake and further in view of Campbell et al. (U.S. 7,196,728). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates and Miyatake et al. as discussed above apply with equal weight here. Campbell et al. relates a screen that includes a plurality of pinholes distributed in the display along with a plurality of sensors with at least one sensor of the plurality of sensors in alignment with and corresponding with one pinhole of the plurality of pinholes to receive light passing through the pinhole to image a ray of a specific size and a specific direction out from the display. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates and Miyatake et al. with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 25 which depends therefrom.

XI. Rejection of Claim 30 under 35 U.S.C. §103(a):

At numbered part 10 of the subject Office Action, claim 30 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato, Takahashi et al., Mates, Miyatake and further in view of Maruyama (U.S. 20060006438). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates and Miyatake et al. as discussed above apply with equal weight here. Maruyama relates to a solid-state image pickup device and a method of manufacturing the same, which can obtain a proper incident state in each pixel and can achieve an improvement in photoreceptive efficiency and even sensitivity in each pixel. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates and Miyatake et al. with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 31 which depends therefrom.

XII. Rejection of Claim 31 under 35 U.S.C. §103(a):

At numbered part 11 of the subject Office Action, claim 31 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view of Takahashi et al., Mates, Miyatake and further in view of Tangen et al. (U.S. 6,765,617). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates and Miyatake et al. as discussed above apply with equal weight here. Tangen et al. relates an optoelectronic camera comprises an objective system formed by a number of optical active structures (L), particularly refractive structures in the form of microlenses or lenslets provided in an array. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates and Miyatake et al. with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 31 which depends therefrom.

XIII. Rejection of Claim 32 under 35 U.S.C. §103(a):

At numbered part 12 of the subject Office Action, claim 32 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato, Takahashi et al., Mates, and Miyatake and further in view of Sasano et al. (U.S. 5,466,926). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates and Miyatake et al. as discussed above apply with equal weight here. Sasano et al. relates a colored microlens array which functions as both a color filter array of different color filter layers and transparent microlenses. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates, and Miyatake et al. with respect to independent claim 1 as it fails to teach or suggest a

monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 32 which depends therefrom.

XIV. Rejection of Claim 33 under 35 U.S.C. §103(a):

At numbered part 13 of the subject Office Action, claim 33 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view of Takahashi et al., Mates, and Miyatake and further in view of Crosby et al. (U.S. 20040201890). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates, and Miyatake et al. as discussed above apply with equal weight here. Crosby et al. relates to microlenses including wire-grid polarizers and methods for their manufacture. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates, and Miyatake et al. with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 33 which depends therefrom.

XV. Rejection of Claims 34 under 35 U.S.C. §103(a):

At numbered part 14 of the subject Office Action, claim 34 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kato in view of Takahashi et al., Mates, and further in view of Mizuguchi et al. (U.S. 5,543,942). Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claims depend.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates as discussed above apply with equal weight here. Mizuguchi et al. relates discloses an opposed substrate for use in a liquid crystal display element, for example. The opposed substrate is constructed by a

transparent substrate, microlenses formed on the substrate, a bonding layer, and cover glass. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 34 which depends therefrom.

XVI. Rejection of Claims 35, 36 and 41 under 35 U.S.C. §103(a):

At numbered part 15 of the subject Office Action, claims 35, 36 and 41 are rejected under 35 U.S.C. §103(a) as being unpatentable over Baharav et al. (U.S. 7274808), Kato in view of Takahashi et al. and Mates. Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claims depend.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates as discussed above apply with equal weight here. Baharav et al. relates to an imaging system for imaging a fingerprint that operates in at least two different modes to provide both finger recognition and finger navigation applications. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claims 35, 36 and 41 which depend therefrom.

XVII. Rejection of Claims 37 and 38 under 35 U.S.C. §103(a):

At numbered part 16 of the subject Office Action, claims 37 and 38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Saito et al. (U.S. 20040129787), Kato in view of Takahashi et al. and Mates. Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claims depend.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates as discussed above apply with equal weight here. Saito et al. relates to a high security identification card includes an on-board memory for stored biometric data and an on-board sensor for capturing live biometric data. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claims 37 and 38 which depend therefrom.

XVIII. Rejection of Claims 39 under 35 U.S.C. §103(a):

At numbered part 17 of the subject Office Action, claim 39 is rejected under 35 U.S.C. §103(a) as being unpatentable over Campbell et al. (U.S. 20050061951), Kato in view of Takahashi et al., and further in view of Mates. Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates as discussed above apply with equal weight here. Campbell et al. relates to an image sensor is formed with shifts among the optical parts of the sensor and the photosensitive parts of the sensor. The optical parts of the sensor may include a color filter array and/or microlenses. The photosensitive part may include any photoreceptors such as a CMOS image sensor. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 39 which depends therefrom.

XIX. Rejection of Claims 40 under 35 U.S.C. §103(a):

At numbered part 18 of the subject Office Action, claim 40 is rejected under 35 U.S.C. §103(a) as being unpatentable over Schneider et al. (U.S. 7,027,719), Kato in view of Takahashi et al., and further in view of Mates. Withdrawal of this rejection is requested for at least the following reasons. The cited art, alone or in combination, does not teach or suggest all aspects of independent claim 1 from which the subject claim depends.

The reasons for patentability of claim 1 over Kato, Takahashi et al., Mates as discussed above apply with equal weight here. Schneider et al. relates to a catastrophic-event survivable video data recording system that may be employed to monitor vehicles or facilities. However, it fails to make up for the aforementioned deficiency of Kato, Takahashi et al., Mates with respect to independent claim 1 as it fails to teach or suggest a monolithic structure as recited in claim 1. Therefore, this rejection should be withdrawn with respect to claim 40 which depends therefrom.

Conclusion:

In view of the foregoing, Applicant submits that the instant claims are in condition for allowance. Early and favorable action is earnestly solicited. The fee for the petition is included herewith. In the event there are any fees due and owing in connection with this matter, please charge same to our Deposit Account No. 11-0223.

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